

REMARKS

The Final Office Action dated May 31, 2007 has been received and carefully noted. The above amendments to the claims and the following remarks are submitted as a full and complete response thereto.

By this response, claim 25 has been amended to more particularly point out and distinctly claim the subject matter of the invention, and claim 26 has been added. Claims 1-12 were previously canceled without prejudice or disclaimer. No new matter has been added and no new issues are raised which require further consideration and/or search. Accordingly, claims 13-26 are currently pending in the application, of which claims 13, 24, 25, and 26 are independent claims.

In view of the above amendments and the following remarks, Applicant respectfully requests reconsideration and timely withdrawal of the pending claim rejections for the reasons discussed below.

Claim Objections

The Office Action objected to claims 1, 24, and 25 because the amended portion of the claims allegedly utilizes the phrase “configured to”. The Office Action asserted that the phrase “configured to” is considered to be analogous to the phrases “adapted to” and “capable of”. Further, the Office Action stated that “it has been held that the recitation that an element is “adapted to” or “capable of” performing a function is not a

positive limitation but only requires the ability to so perform. It does not constitute a limitation in any patentable sense.

Applicant respectfully disagrees with the Office Action's claim objection of claims 1, 24, and 25. As previously noted, claim 1 has been canceled with prejudice or disclaimer; therefore, the objection to claim 1 is now moot.

Further, Applicant respectfully submits that since 1976, more than 200,000 patents have issued containing the words "configured" or "configuring" in the claims. Such patents continue to issue on a weekly basis. The use of the verb "to configure;" therefore, can be seen to be a widely accepted word for claiming inventions. The Office Action cited *In re Hutchinson*, 69 USPQ 138, but *In re Hutchinson* in no way stands for the idea that "configured to" is an inappropriate way to draft claims. Quite to the contrary, "configured to" defines a specific configuration. Accordingly, Applicant respectfully submits that the objection to claims 24 and 25 is improper, and respectfully request withdrawal of the claim objections.

Therefore, Applicant respectfully submits that claims 24 and 25 are in condition for allowance.

Claim Rejections under 35 U.S.C. §103(a)

The Office Action rejected claims 13-25 under 35 U.S.C. §103(a) as allegedly being unpatentable as obvious over Guiver, *et al.* (U.S. Patent No. 5,809,490) ("Guiver") in view of Sirosh (U.S. Patent No. 6,226,408) ("Sirosh"). The Office Action alleged that

Guiver discloses most of the claim elements recited in claims 13-25, citing Sirosh to cure the deficiencies of Guiver. Applicant respectfully traverses this rejection for at least the following reasons.

Claim 13, upon which claims 14-23 are dependent, recites a computer-implemented method. The method includes determining cluster centers in a first data structure, performing a first iterative process for iteratively updating the weight vectors such that the weight vectors move toward the cluster centers, performing a second iterative process for iteratively updating a second data structure utilizing results of the iterative updating of the first data structure, and determining, based on the second data structure, several sets of weight vectors in said lattice structure such that in each set. The first data structure includes a lattice structure of weight vectors that create an approximate representation of a plurality of input data points. The weight vectors correspond to the same cluster centers of the input data points. The method is an unsupervised method that is configured to be suitable for an on-line system.

Claim 24 recites a computer-readable program product including a computer program code embodied on a computer-readable medium, wherein executing the computer program code in a computer causes the computer to carry out a method. The method includes determining cluster centers in a first data structure, performing a first iterative process for iteratively updating the weight vectors such that the weight vectors move toward the cluster centers, performing a second iterative process for iteratively

updating a second data structure utilizing results of the iterative updating of the first data structure, and determining, based on the second data structure, several sets of weight vectors in said lattice structure such that in each set. The first data structure includes a lattice structure of weight vectors that create an approximate representation of a plurality of input data points the weight vectors correspond to the same cluster centers of the input data points. The weight vectors correspond to the same cluster centers of the input data points. The computer program is configured to carry out an unsupervised method that is configured to be suitable for an on-line system.

Claim 25 recites a computer. The computer includes first determination means for determining cluster centers in a first data structure, first performance means for performing a first iterative process for iteratively updating the weight vectors such that the weight vectors move toward the cluster centers, second performance means for performing a second iterative process for iteratively updating a second data structure utilizing results of the iterative updating of the first data structure, and second determination means for determining, based on the second data structure, several sets of weight vectors in said lattice structure such that in each set. The first data structure includes a lattice structure of weight vectors that create an approximate representation of a plurality of input data points. The weight vectors correspond to the same cluster centers of the input data points. The computer is configured to operate using an unsupervised method that is configured to be suitable for an on-line system.

Claims 13-23

As will be discussed below, Guiver in view of Sirosh fails to disclose or suggest every claim element of the claims, and therefore fails to provide the features of the claims discussed above.

Certain embodiments of the present invention provide critical and unobvious advantages over the prior art of record. For example, in certain embodiments of the present invention only one pass through the dataset (*i.e.* epoch) is required. This single pass capability can be especially advantageous when dealing with very large datasets.

The combination of Guiver and Sirosh fails to disclose or suggest all of the claim elements of any of the presently pending claims, and, therefore, fails to provide the above-identified critical and unobvious advantages.

Guiver generally relates to an apparatus and method for selecting a working data set for model development. At column 2, lines 19-21, Guiver discloses a data selection apparatus that augments a set of training examples with the desired output data. Accordingly, Guiver's system is a system of supervised classification, not unsupervised classification, in the sense that, in Guiver, the desired output of the input is added to the input data sample before clustering.

It is readily apparent that Guiver is not proposing a new approach to clustering, but is using classical clustering algorithms to do this. In fact, the use of the term "SOM clusterizer" in Guiver is incorrect, or at least irregular, because the SOM's intended use is

as a topology-preserving vector-quantization algorithm. From Sirosh, however, one of ordinary skill in the art would recognize that Guiver will not be able to find nonlinear data clusters in Guiver's data sets using the classical methods (*e.g.* SOM and K-means) proposed in Guiver.

Sirosh generally relates to unsupervised identification of nonlinear data clusters in multi-dimensional data. Sirosh, at column 1, lines 17-19, discloses that supervised classification is classification in which training data containing examples of known categories are presented to a learning mechanism, which then learns one or more sets of relationships, and which can then handle new data as it comes in. Sirosh asserts, at column 1, lines 27-28, that supervised classification is not useful for certain applications.

Thus, at column 2, lines 6-59, Sirosh discloses that it provides an unsupervised learning technique that combines clustering/vector quantization and data encoding based on proximity and connectedness of the data distribution. Sirosh begins with an unordered collection of vectors and outputs a clustering of such vectors into relatively disjoint clusters. Then Sirosh performs a hierarchical layering of clusters that results in increasing larger clusters that are not necessarily linear in the data space. Sirosh discloses that its invention is particularly suitable to large data mining operations in multidimensional real-world data. The approach that Sirosh proposes is essentially a modified version of the K-Means approach, which Sirosh refers to as the BaNG algorithm.

In a K-means approach, as described by Sirosh (see column 6, lines 13-22), each center represents a single cluster, which is why K-means is used by Sirosh. The K-Means cannot be used to cluster nonlinear clusters, as would be immediately recognized by one of ordinary skill in the art. In the case of the BaNG algorithm (see column 6, lines 46-47 *et seq.*) as employed by Sirosh, the BaNG algorithm is a clustering algorithm in which each weight vector represents a cluster center and is only different from K-Means in the way explained by Sirosh in the cited columns. In other words, neither of these algorithms (K-means or BaNG) provides a mechanism to weight-vectors together so that several weight vectors represent a single (nonlinear) cluster.

The Office Action, at page 15, line 8, responded to the above-discussion of Sirosh (as provided in a response filed February 16, 2007) by asserting that the above-discussion argues features that are not recited in the claims. Applicant respectfully disagrees. Specifically, the Office Action asserted that “to weight-vectors together so that several weight vectors represent a single (nonlinear) cluster” is not recited in the pending claims. However, in view of the specification, one of ordinary skill in the art at the time the invention was made would have understood that the claim limitations implicitly include non-linear clusters as the weight vectors associated with the local-maxima representing the cluster. Further, the above-discussion clearly contrasts Sirosh with certain embodiments of the present invention, both for more clearly identifying the teachings of Sirosh, and also for showing that the claims are nonobvious because of critical and unobvious advantages that accrue from claimed embodiments.

Claim 13 recites, among other things, “determining, based on the second data structure, several sets of weight vectors in said lattice structure such that in each set, the weight vectors correspond to the same cluster centers of the input data points.” Sirosh fails to disclose or suggest at least this feature of the claims, and the Office Action admitted that Guiver fails to disclose or suggest at least this feature of the claims. Thus, the combination of Guiver and Sirosh fails to disclose or suggest at least this feature of the claims.

The Office Action cited column 6, lines 22-26, and column 6, line 46, to column 7, line 33, of Sirosh as disclosing the feature “determining, based on the second data structure, several sets of weight vectors in said lattice structure such that in each set, the weight vectors correspond to the same cluster centers of the input data points.” Applicant respectfully disagrees with the Office Action’s analysis.

The cited portion of Sirosh is part of Sirosh’s “Vector Quantization,” which is one of three processes that Sirosh implements at each layer or stage of its hierarchy, as can be seen from column 4, line 64, to column 5, line 12. Furthermore, the fact that the cited discussion relates to the “Vector Quantization” process can be seen from the heading “Vector Quantization” at column 5, line 50.

Sirosh’s “Vector Quantization” does not produce a result “such that in each set, the weight vectors correspond to the same cluster centers of the input data points.” Instead, as Sirosh explains at column 7, lines 34-37, the operations cited by the Office Action normalize the location of the cluster center in the vector space, accounting for the

influence or contribution of all of the input vectors and not merely those that are closest to the cluster center.

In other words, the function of Sirosh's vector-quantization is the same as the function of the SOM: it provides a topologically ordered vector quantization of the data space. Sirosh's vector-quantization does not provide the clusters.

The Office Action, at page 16, item 9, stated that "The claim language of the iterative process mentions that the weight vectors move toward the cluster centers, however, it is not seen how the claim language restricts only the input vectors closest to the cluster center to contribute." This statement, although identified in connection with the claim feature "determining, based on the second data structure, several sets of weight vectors in said lattice structure such that in each set, the weight vectors correspond to the same cluster centers of the input data points," as recited in claim 13, is not responsive to the argument presented, because it does not maintain that the cited art discloses what is claimed.

Furthermore, as fully established above, the recitation in the present claims of "such that in each set, the weight vectors correspond to the same cluster centers of the input data points," does fully distinguish what is claimed from the cited art, whether or not "the claim language restricts only the input vectors closest to the cluster center to contribute," as argued (in the negative) by the Office Action.

Furthermore, claim 13 recites “wherein the method is an unsupervised method that is configured to be suitable for an on-line system.” The cited combination does not disclose or suggest at least this feature of claim 13.

As noted above, Guiver can be described as a supervised method, and Guiver would not work as intended if it were converted from supervised to unsupervised, because Guiver relies on a training sequence for initialization. Accordingly, Applicant respectfully submits that the combination proposed in the Office Action is *per se* non-obvious, because the combination would render Guiver unsuitable for its intended purpose.

MPEP §2143.01(V) states “THE PROPOSED MODIFICATION CANNOT RENDER THE PRIOR ART UNSATISFACTORY FOR ITS INTENDED PURPOSE,” (Capital letters in original) and explains that “If proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification.” Moreover, MPEP §2145(III) states that “the claimed combination cannot change the principle of operation of the primary reference or render the reference inoperable for its intended purpose.” The proposed combination would fundamentally alter the principles of operation of Guiver, rendering Guiver unsatisfactory for its intended purpose. Thus, the MPEP indicates that the proposed modification of Guiver is improper. For this further reason, it is respectfully requested that the rejection of claim 13 be withdrawn.

Furthermore, Applicant respectfully traverses the Office Action's position that it would have been obvious to combine Guiver and Sirosh. The Office Action took the position that both Guiver and Sirosh disclose unsupervised clustering. However, as explained above, Guiver involves supervised categorizing, utilizing a training example, and not unsupervised categorizing. Compare Sirosh, column 1, lines 17-19, "In supervised classification, training data containing examples of known categories are presented to a learning mechanism," with Guiver, column 2, lines 19-21, "The present invention provides a data selection apparatus which augments a set of training examples with the desired output data." Accordingly, the factual basis upon which the Office Action sought to establish motivation to combine actually contradicts the proposed motivation to combine.

The Office Action specifically asserted that Guiver discloses the feature "wherein the method is an unsupervised method that is configured to be suitable for an on-line system," as recited in claim 13, at column 6, line 54, to column 7, line 8. Applicant respectfully disagrees.

The cited passage does indicate that the clusterizer used in one alternative embodiment of Guiver is a Kohonen self organizing map (SOM), and states that the Kohonen SOM is an unsupervised learning network. Nevertheless, what is claimed is not simply that an unsupervised learning network is employed, but that the method "is an unsupervised method that is configured to be suitable for an on-line system."

The Office Action, at page 16, item 10, argued that page 5, lines 19-23, of the present application indicate that “automatically determining cluster centers in an unsupervised manner is defined as not having to predefine the number of clusters.”

In fact, the present specification, in the cited passage states that “In the following, a method based on the SOM algorithm is described which can be used to automatically determine cluster centers in an unsupervised manner. In other words, the number of clusters does not have to be predefined and groups of adjacent SOM weight vectors represent the cluster centers.” This is not an explicit definition of the term “unsupervised,” and accordingly it does not vary the ordinary meaning of the term as the term is used in the art. Sirosh explains what the term “unsupervised” means to one of ordinary skill in the art, and since Applicant has not explicitly defined the term contrary to the ordinary sense, the ordinary meaning of the term should prevail. Accordingly, because Guiver clearly requires training data (in fact, that feature is absolutely central to Guiver), Guiver’s method cannot be said to be an “unsupervised method” as that term would be understood by one of ordinary skill in the art, as evidenced by Sirosh.

Moreover, the Office Action asserted that the combination would “more accurately identify cluster centers.” However, the Office Action did not cite any evidence in support of this assertion, and it is unclear what type of accuracy the Office Action has in mind. Without the citation of evidence and without explanation, it appears that the Office Action reflects attempted improper hindsight reconstruction of the claim

recitations, without motivation for such reconstruction existing in the prior art, either in the references themselves or in the knowledge of one of ordinary skill in the art.

It is insufficient to merely identify each element in the prior art to establish unpatentability of the combined subject matter as a whole. Instead, the reasons one of ordinary skill in the art would have been motivated to select the references and to combine them to render the claimed invention obvious must be articulated. *Abbott Labs. v. Andrx Pharm., Inc.*, 452 F.3d 1331, 1336 (Fed. Cir. 2006). In the present rejection, one of the alleged reasons for motivation to combine is clearly mistaken, and the other reason is both vague and without evidence.

To protect against such invalid and inappropriate hindsight reconstruction, the Federal Circuit has ruled that references cannot be selected, and selected elements from selected references cannot be combined, without some suggestion, motivation, or teaching that would render obvious that selection and that combination. *See, e.g., Karsten Mfg. Corp. v. Cleveland Golf Co.*, 242 F.3d 1376, 1385, 58 USPQ2d 1286, 1293 (Fed. Cir. 2001) (“In holding an invention obvious in view of a combination of references, there must be some suggestion, motivation, or teaching in the prior art that would have led a person of ordinary skill in the art to select the references and combine them in the way that would produce the claimed invention.”); and *Brown & Williamson Tobacco Corp. v. Philip Morris Inc.*, 229 F.3d 1120, 1124-25 (Fed. Cir. 2000) (“a showing of a suggestion, teaching, or motivation to combine the prior art references is an ‘essential component of an obviousness holding’”).

As noted above, the Office Action asserted that it would have been obvious to combine the references to “more accurately identify cluster centers.” The Office Action did not provide any citation for this alleged motivation, and the alleged motivation does not come from the cited references. Therefore, the Office Action’s assertion of motivation to combine the references is not based on evidence presented in the Office Action. The only basis of record for producing what is claimed is the present application. Using the present application as the basis for combination, however, is improper hindsight reconstruction. Accordingly, the claim rejection should be withdrawn.

The Office Action, at page 17, item 11, responded by including Form paragraph 7.37.03 from MPEP §707.07(f), which explains the condition in which hindsight reasoning is proper.

However, as that form paragraph and MPEP §2145(X)(A) indicate, such hindsight reasoning is only proper “so long as it takes into account only knowledge which was within the level of ordinary skill in the art at the time the claimed invention was made.” Furthermore, as explained by MPEP §2145(X)(C): “As discussed in MPEP §2143.01, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify or combine reference teachings.” The Office Action’s proposed motivation, in contrast, is not found in the references themselves or in the knowledge generally available to one of ordinary skill in the art. Furthermore, the Office Action’s proposed motivation does not take into account only knowledge which was within the level of ordinary skill in the art at the time

the claimed invention was made. Accordingly, the rejection constitutes impermissible hindsight reconstruction; therefore, the rejection should be withdrawn.

Additionally, as noted above, Sirosh disparages supervised categorization as being “not useful” for the sorts of applications to which Sirosh is directed (Sirosh, column 1, lines 26-29). Accordingly, Sirosh expressly teaches away from combination between its own technique and the supervised technique of Guiver. Thus, the evidence of record shows that the proposed combination of Guiver and Sirosh is not obvious, because it is contrary to the conventional thinking reflected in the disclosure of Sirosh. Accordingly, the claim rejection should be withdrawn.

As best understood, the Office Action at page 16, item 10, attempted to respond to the evidence of teaching away (as well as the above proof that the proposed modification of Guiver would render it unsuitable for its intended purpose) by arguing (in essence) that Guiver is “considered to be applicable” to the present application and that “the combination of Guiver and Sirosh is not intended to alter the purpose of Sirosh ... [features] of Sirosh are being utilized with Guiver in order to enhance Guiver.” This argument, however, is not properly responsive.

First, the evidence presented showed that the purpose of Guiver (not Sirosh) would be undermined by the combination. Second, the evidence showed Sirosh clearly teaching away from the approach of Guiver. The Office Action is required to consider the teachings of the cited art as a whole, it is not permitted to simply extract features from Sirosh based on the disclosure of the present application.

As MPEP §2141 (II) indicates, “When applying 35 U.S.C. §103, the following tenets of patent law must be adhered to:(A)The claimed invention must be considered as a whole; (B)The references must be considered as a whole and must suggest the desirability and thus the obviousness of making the combination; (C)The references must be viewed without the benefit of impermissible hindsight vision afforded by the claimed invention; and (D)Reasonable expectation of success is the standard with which obviousness is determined. *Hodosh v. Block Drug Co., Inc.*, 786 F.2d 1136, 1143 n.5, 229 USPQ 182, 187 n.5 (Fed. Cir. 1986).” (emphasis added) As should be clear, the consideration of the entirety of the teachings of Sirosh is not optional, and the Office Action consequently cannot ignore the evidence of teaching away in Sirosh and of undermined intended purpose in Guiver. Accordingly, the claim rejection should be withdrawn.

Claims 14-23 are dependent upon claim 13. Accordingly, claims 14-23 should be allowed for at least their dependency upon claim 13 and for the specific limitations recited therein.

Claims 24-25

Claims 24 and 25 each have their own scope, but each contain recitations similar to those discussed above with regard to claim 13. Specifically, Guiver in view of Sirosh fails to disclose or suggest at least “determining, based on the second data structure, several sets of weight vectors in said lattice structure such that in each set, the weight

vectors correspond to the same cluster centers of the input data points, wherein the executing the computer program is configured to carry out an unsupervised method that is configured to be suitable for an on-line system” as recited in claim 24.

Further, Guiver in view of Sirosh fails to disclose or suggest at least “second determination means for determining, based on the second data structure, several sets of weight vectors in said lattice structure such that in each set, the weight vectors correspond to the same cluster centers of the input data points, wherein the computer is configured to operate using an unsupervised method that is configured to be suitable for an on-line system” as recited in claim 25.

Accordingly, Guiver in view of Sirosh fails to disclose or suggest every claim feature recited in claims 24 and 25; therefore, claims 24 and 25 should now be in condition for allowance.

New Claim 26

Claim 26 has its own scope, but contains recitations similar to those discussed above with regard to claims 13, 24, and 25. Specifically, Guiver in view of Sirosh fails to disclose or suggest at least “a second determination unit configured to determine, based on the second data structure, several sets of weight vectors in said lattice structure such that in each set, the weight vectors correspond to the same cluster centers of the input data points, wherein the computer is configured to operate using an unsupervised method that is configured to be suitable for an on-line system” as recited in claim 26.

Accordingly, Guiver in view of Sirosh fails to disclose or suggest every claim feature recited in claim 26; therefore, claim 26 should be in condition for allowance.

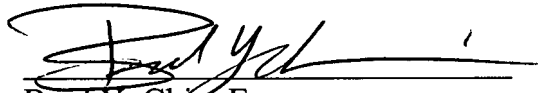
CONCLUSION

In conclusion, Applicant respectfully submits that Guiver and Sirosh fail to disclose or suggest every claim feature recited in claims 1-26. The distinctions previously noted are more than sufficient to render the claimed invention unobvious. Further, Applicant respectfully submits that the phrase “configured to” is a widely accepted phrase for claiming inventions, and disagree with the Office Action’s interpretation of *In re Hutchison* in objecting to the aforementioned phrase. It is therefore respectfully requested that all of claims 1-26 be allowed, and this present application passed to issuance.

If for any reason the Examiner determines that the application is not now in condition for allowance, it is respectfully requested that the Examiner contact, by telephone, the Applicant’s undersigned attorney at the indicated telephone number to arrange for an interview to expedite the disposition of this application.

In the event this paper is not being timely filed, the Applicant respectfully petition for an appropriate extension of time. Any fees for such an extension together with any additional fees may be charged to Counsel's Deposit Account 50-2222.

Respectfully submitted,



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